


National Aeronautics & Space Administration

NASA Smart Skies™:
The “Plane” Truth About $D = R \cdot T$

Grades 5-9

All Materials Free!



Standards Based!

Rebecca Green

AIAA “Passport to the Future” ~ Denver, CO

August 3, 2009


Agenda

Time (Minutes)	Activities
5	Welcome
15	Introduction to Air Traffic Control & the Simulator
15	Explore a Problem on the Simulator
15	Learn the Underlying Math on the Simulator
10	Learn How to Access the Free Classroom Materials
60 minutes	


Smart Skies™

Two Classroom Activity Sets

FlyBy Math™



LineUp With Math™



Free!

- Real-world applications
- Hands-on experiments
- Multiple representations

Free!

Smart Skies™

Intro to Air Traffic Control

During the busiest travel times, about how many commercial planes are flying in the US?

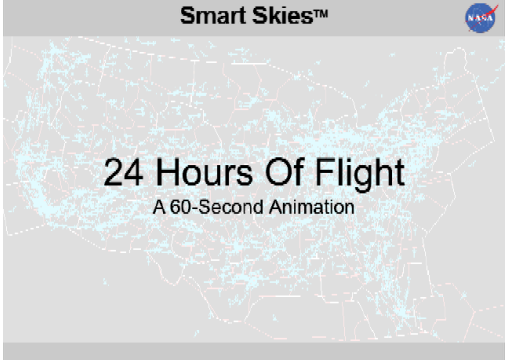


About 5,000 planes!

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World’s Largest D-R-T Problem

Smart Skies™



24 Hours Of Flight
A 60-Second Animation


Smart Skies™

LineUp with Math™

Math-Based Decisions in Air Traffic Control (ATC)

Distance = Rate • Time

Proportional Reasoning



Web-based ATC simulator

- Act as an Air Traffic Controller.
- Use a simulator and **math**
 - to change plane routes and speeds
 - to keep planes safely separated and on time.

Smart Skies™

LineUp with Math™

NASA

- Full set of free classroom materials
 - Simulator with dozens of problems
 - Student workbooks, videos, teacher support materials
- Standards-based
 - Proportional reasoning
 - Problem solving
 - Decision making
- Classroom-tested
 - Over 5,000 students nation-wide

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Intro to ATC and the Simulator

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"Welcome to Sector 33" Video

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ATC Simulator Problem 3-8

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Three planes all flying to SFO through Modesto (MOD).

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The Goal at MOD

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The planes must be spaced 3 Nmi apart at MOD.
The last plane must arrive in 3 mins and 48 secs.

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A Closer Look at the Goal

NASA

The planes must be spaced 3 Nmi apart at MOD.
The last plane must arrive in 3 mins and 48 secs.

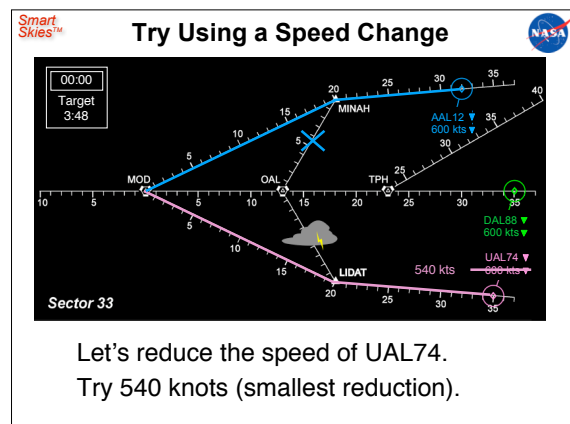
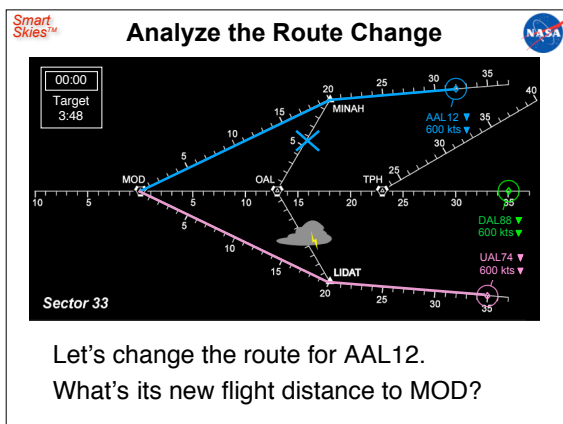
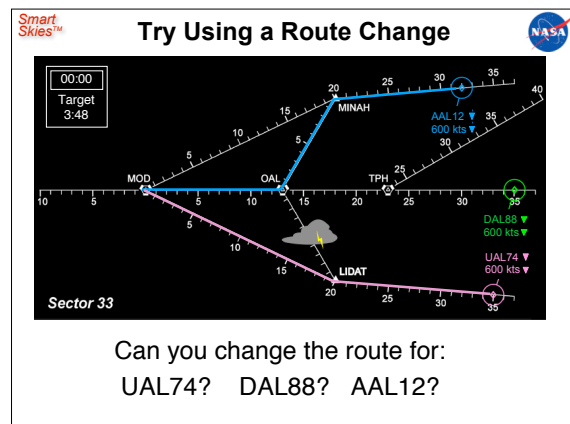
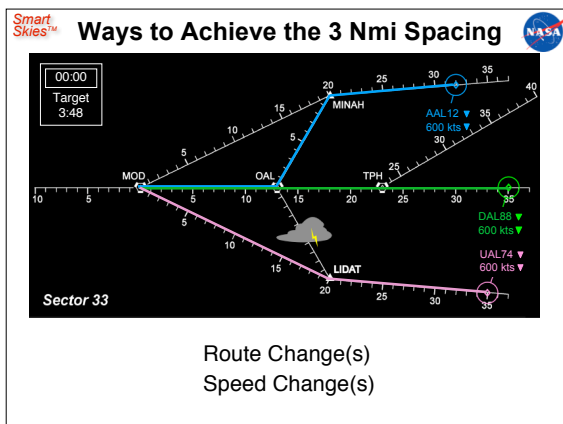
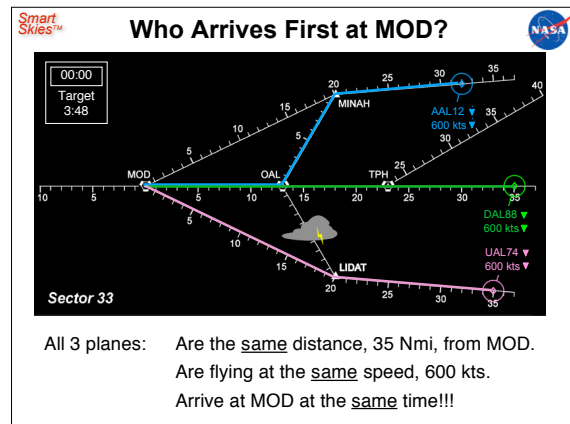
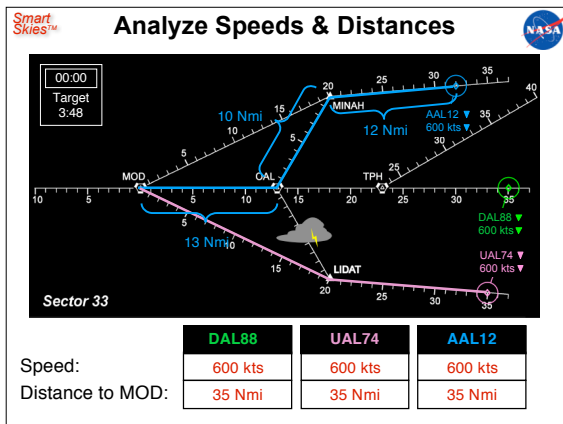
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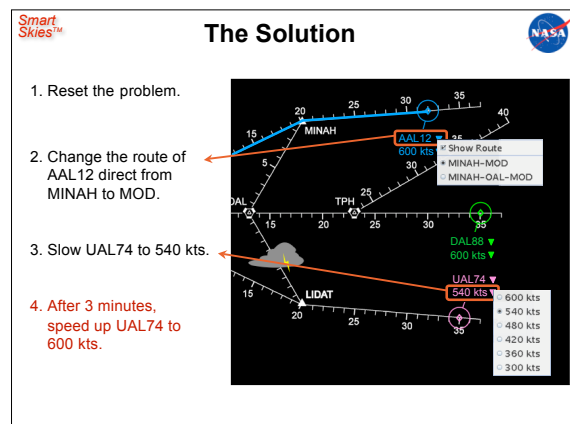
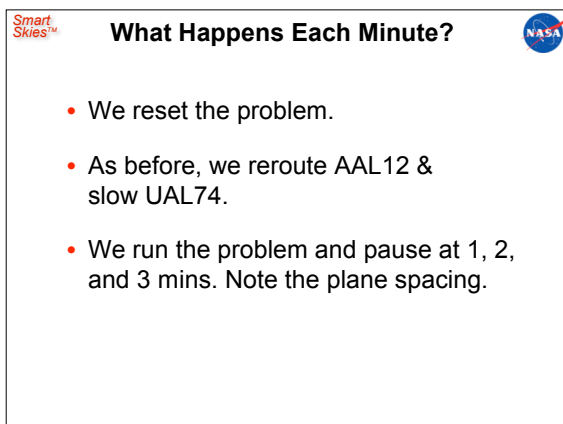
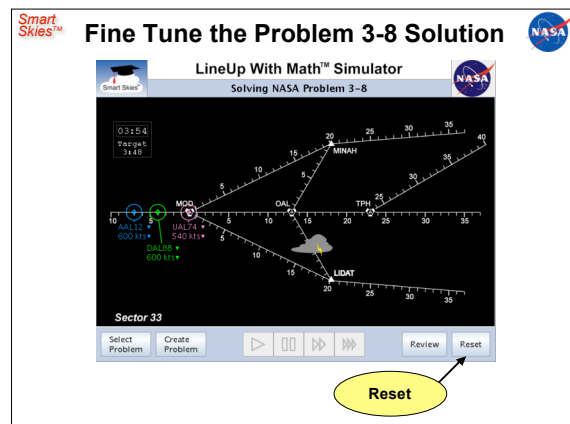
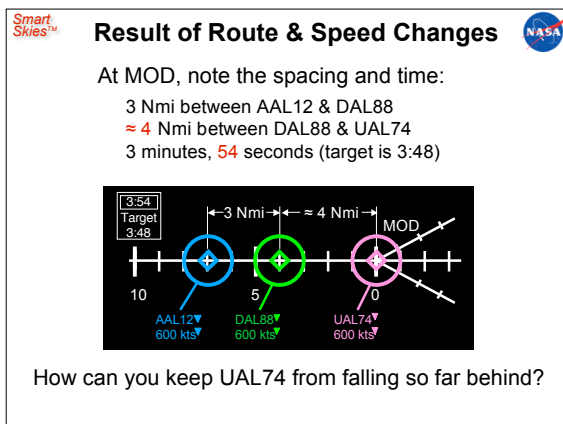
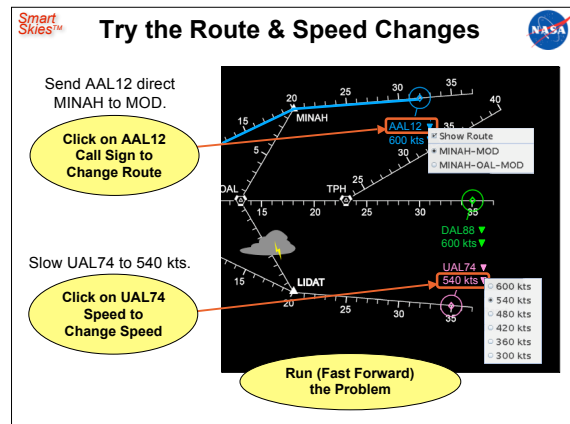
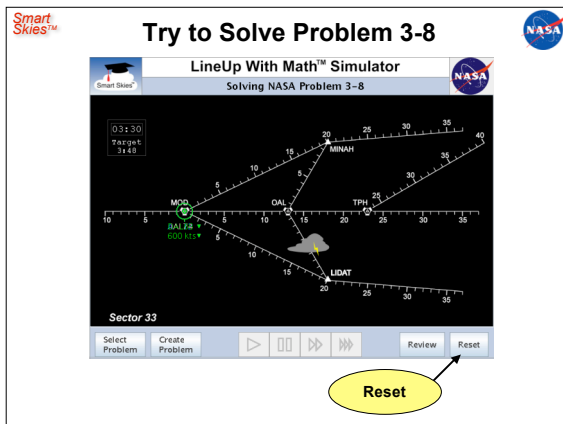
Select and Run Problem 3-8

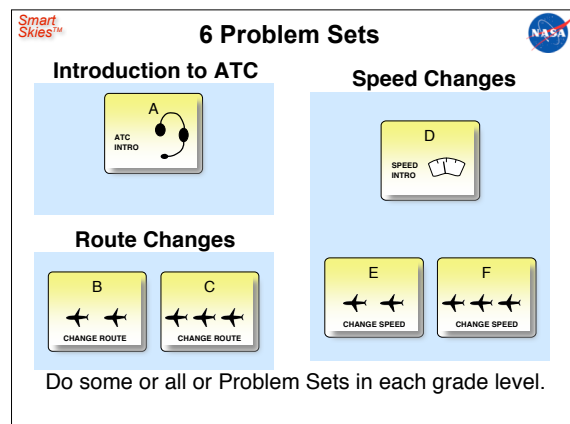
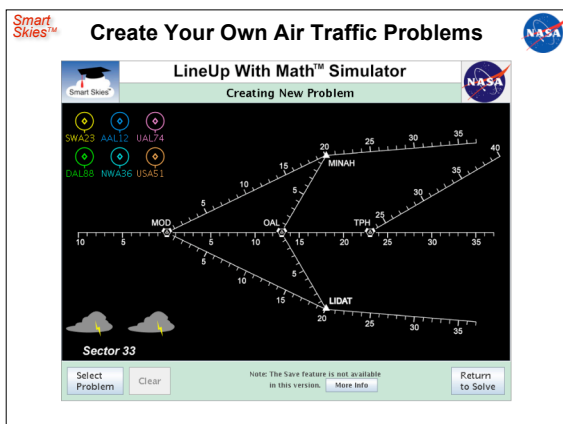
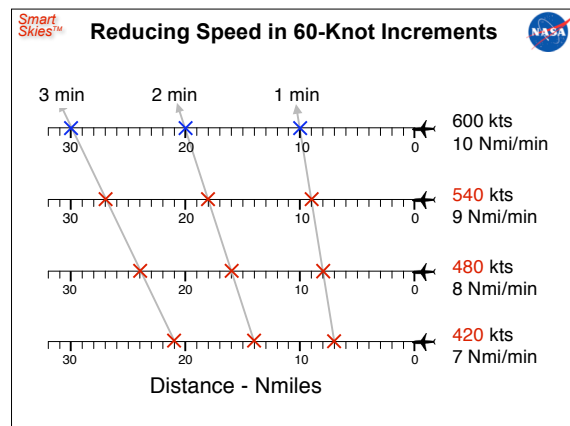
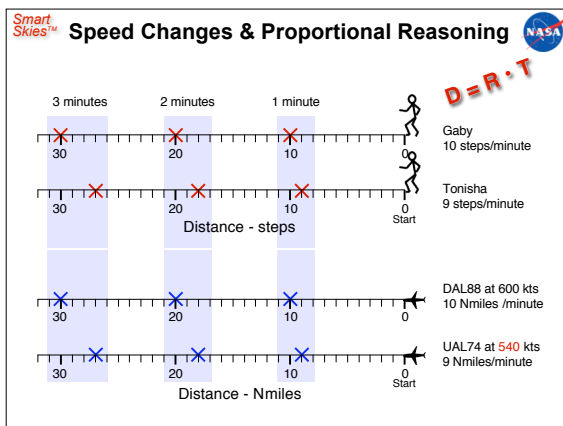
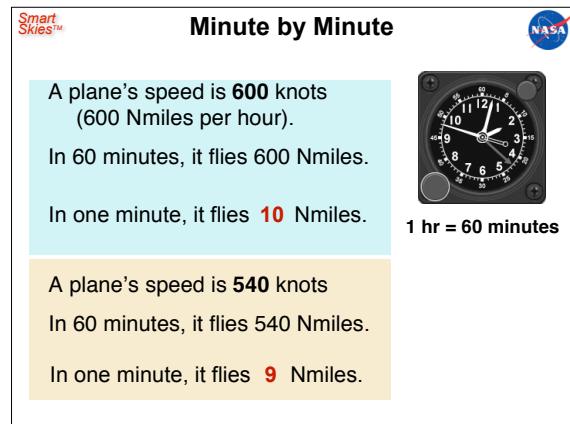
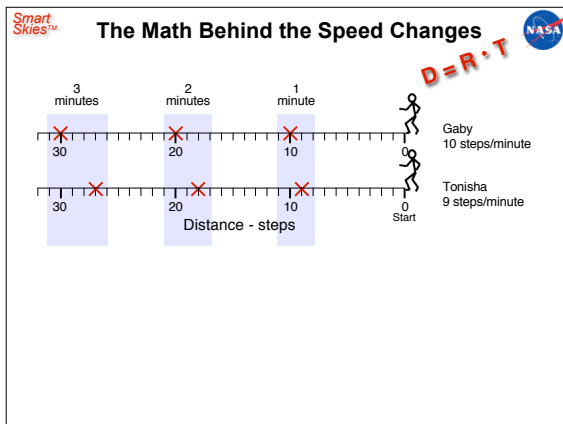
NASA

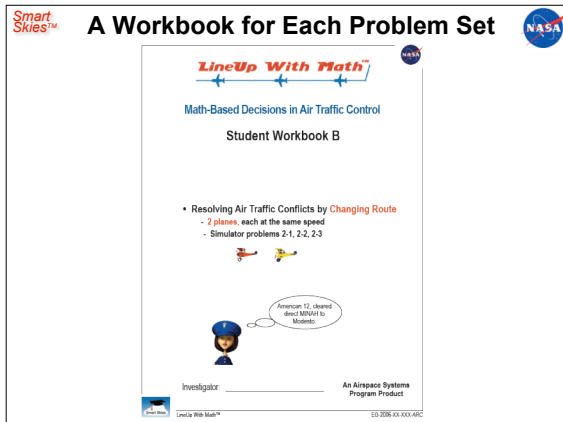
1. Select Problem

2. Run Problem










Workbooks Support the Simulator


- Paper-and-pencil worksheets introduce:
 - Air traffic control concepts
 - Problem analysis and solution methods
- Structured learning environment
- Initial worksheets provide most scaffolding

Classroom Implementation


Explore with the Simulator.



Do the math in the Workbook.



Meet the time challenge.



Student Materials

Free Online!

Ready to Download!

- Movies
- Workbook for each Problem Set
- Simulator
- Animated Simulator tutorial
- Simulator Quick Start Guide

Educator Materials

Free Online!

Ready to Download!

- 2-page Quick Start Guide
- Educator Guide
- Teacher Guide for each Problem Set with Answers & Solutions
- Answers & Solutions to All Simulator Problems

www.smartskies.nasa.gov

Free!

Smart Skies Homepage

Teacher access to ALL materials

Smart Skies™ **www.smartskies.nasa.gov/lineup** NASA

Free!

LineUp With Math Homepage

Teacher access to all materials

LineUp With Math™

Math-Based Decisions in Air Traffic Control (ATC) Grades 5 - 9

$D = R \cdot T$

Learn About LineUp With Math™

Read an Overview View a Video

Read About the Simulator

Explore the Problem Sets

Click Below to Access the Simulator and 6 Problem Sets

A ATC INTRO B CHANGE ROUTE C CHANGE ROUTE D SPEED INTRO E CHANGE SPEED F CHANGE SPEED

Smart Skies™ **Two Ways to Access Materials** NASA

- The navigation bar at the top of the web page

Teacher Mat's Student Mat's Standards Give a Workshop Simulator Videos ATC Informal Ed Contact Us

Alignments

- The problem & Simulator buttons at the bottom

A ATC INTRO B CHANGE ROUTE C CHANGE ROUTE D SPEED INTRO E CHANGE SPEED F CHANGE SPEED

Smart Skies™ **www.atcsim.nasa.gov** NASA

Free!

Air Traffic Control Simulator

Be an Air Traffic Controller!

Click Here to Open the Simulator

Click here to link to the Air Traffic Control Simulator

Simulator & Student Page

First Time? Start here

- "24 Hours of Flight" video
- "Welcome to Sector 33" video
- What's the Goal?

Learn more

- Simulator Quick Start Guide (480 KB PDF)
- Animated Simulator Tutorial

Smart Skies™ **Smart Skies Dissemination** NASA

- Professional development workshops at math and science conferences—e.g., NCTM, NSTA, ...
- NCTM *Mathematics Teaching in the Middle School*, August 2006

Mathematics Teaching in the Middle School

What's on Your Radar Screen

Smart Skies™ **Smart Skies Dissemination** NASA

- Museums
 - Smithsonian Udvar-Hazy Center
 - Hiller Aviation Museum
- National partnership with FAA
 - Classroom visits from air traffic controllers
 - Student visits to air traffic control facilities

www.faa.gov/education

Smart Skies™ **Materials for Teacher Workshops** NASA

www.smartskies.nasa.gov/trainer

Give A Workshop

Download a PowerPoint presentation

LineUp With Math™

Choose either product

Plan your 90-minute workshop...

- Choose a product (LineUp With Math)
- Learn about the product
- Read a workshop overview
- Gather the workshop materials
- Prepare to conduct the workshop
- Set up and conduct the workshop

Introduce the Simulator to teachers and students in 3 minutes!

Thanks for your Support

Now you're cleared for takeoff!



Contact Us



- **By email:** smartskies@mail.nasa.gov
- **On the web:** www.smartskies.nasa.gov
www.atcsim.nasa.gov
 - Greg Condon, Project Lead -
gregory.condon@nasa.gov
 - Miriam Landesman, Education Lead -
mlandesman@comcast.net